CLAIMS

1. A communication system which comprises a plurality of communication terminals and based on a message originated from a first communication terminal to a third communication terminal via a second communication terminal, the second and third communication terminals create a route to the first communication terminal and communication is made between the first and third communication terminals via the created route,

wherein the second and third communication terminals comprise:

route creation means for creating a plurality of the routes to the first communication terminal by duplicatively receiving the message; and

route management means for storing and managing the plurality of routes created by the route creation means, and

the route management means establishes one of the created routes as a communication route to the first communication terminal and changes the communication route to any of the plurality of routes depending on needs.

2. The communication system according to claim 1,

wherein the route management means specifies a priority for each of the created routes based on a specified criterion and preferentially establishes the route with the high priority as the communication route.

3. A communication terminal device comprising:

transmission means for transmitting a specified message assigned with an intended first communication terminal as

transmission destination;

route creation means for duplicatively receiving a response to the message originated from the first communication terminal and transferred via a second communication terminal to create a plurality of routes up to the first communication terminal;

route management means for storing the plurality of routes created by the route creation means and establishing one of the plurality of routes as a communication route; and

communication means for communicating with the first communication terminal via the established communication route,

wherein the route management means switches the communication route to any of the plurality of routes depending on needs.

4. The communication terminal device according to claim 3,

wherein the communication means starts communication with the first communication terminal after the route creation means receives the first response and a specified time interval elapses, or after reception of a specified number of the responses from the first communication terminal.

5. The communication terminal device according to claim 3,

wherein the route management means specifies a priority for each of the created routes based on a specified criterion and preferentially establishes the route with the high priority as the communication route.

6. The communication terminal device according to claim 3,

wherein the route management means lists to manage specified information about the created routes.

7. The communication terminal device according to claim 4, wherein the route management means dynamically changes the criterion depending on a communication situation of the route and reassigns the priority to the created route.

8. The communication terminal device according to claim 3, wherein the route management means deletes a route which belongs to the plurality of created routes and is unused for a specified time period.

9. The communication terminal device according to claim 3, wherein, when the created routes exceed a predetermined maximum value, the route management means successively deletes the routes in a chronological order.

10. A control method for a communication terminal device comprising:

a first step of transmitting a specified message assigned with an intended first communication terminal as transmission destination;

a second step of duplicatively receiving a response to the message originated from the first communication terminal and transferred via a second communication terminal to create a plurality of routes up to the first communication terminal; and

a third step of establishing one of the plurality of routes as a communication route and communicating with the first communication terminal via the communication route,

wherein the third step switches the communication route to

any of the plurality of routes depending on needs.

11. A program which allows a computer to perform a process comprising:

a first step of transmitting a specified message assigned with an intended first communication terminal as transmission destination;

a second step of duplicatively receiving a response to the message originated from the first communication terminal and transferred via a second communication terminal to create a plurality of routes up to the first communication terminal; and

a third step of establishing one of the plurality of routes as a communication route, communicating with the first communication terminal via the communication route and switching the communication route to any of the plurality of routes depending on needs.

12. A communication terminal device which relays a message originated from a first communication terminal to a second communication terminal and creates a route to the first communication terminal based on the message, the communication terminal device comprising:

route creation means for creating a plurality of the routes to the first communication terminal by duplicatively receiving the message; and

route management means for storing and managing the plurality of routes created by the route creation means,

wherein the route management means establishes one of the created routes as a communication route to the first communication terminal and changes the communication route to any of the plurality

of routes depending on needs.

13. A control method for a communication terminal device which relays a message originated from a first communication terminal to a second communication terminal and creates a route to the first communication terminal based on the message, the control method comprising:

a first step of creating a plurality of the routes to the first communication terminal by duplicatively receiving the message; and

a second step of storing and managing the plurality of routes, and

the second step establishes one of the created routes as a communication route to the first communication terminal and changes the communication route to any of the plurality of routes depending on needs.

14. A communication system which comprises a plurality of communication terminals, and based on a first message originated from a first communication terminal to a third communication terminal via a second communication terminal and a second message originated from a first communication terminal in response to the first message to the first communication terminal via the second communication terminal, creates routes to the first through third communication terminals by using the first through third communication terminals to communicate between the first and third communication terminals via the created routes,

wherein the first communication terminal has route request transmission means for transmitting a route request composed of

a request for the route to be used for the communication with the third communication terminal, and

the second and third communication terminals have: route creation means for duplicatively receiving the first or second message to create the plurality of routes to the first or third communication terminal; and route establishment means for establishing a communication route between the first and third communication terminals using a route which belongs to the plurality of routes created by the route creation means and satisfies the route request transmitted from the first communication terminal.

15. The communication system according to claim 14,

the route request transmission means for the first communication terminal transmits the route request corresponding to an attribute of data to be transmitted to the third communication terminal according to the communication.

16. The communication system according to claim 14,

wherein the third communication terminal has response origination means for originating a response corresponding to the route request when the route request is received;

wherein the first communication terminal has route establishment means for establishing the communication route to the third communication terminal using the route satisfying the route request based on the response transmitted from the third communication terminal via the second communication terminal, and

the route establishment means for the first through third communication terminals individually establishes the communication route from the first communication terminal to the third

communication terminal and the communication route from third communication terminal to the first communication terminal so as to be different from each other based on the route request and the response to the route request.

17. The communication system according to claim 14,

wherein route request transmission means for the first communication terminal transmits the route request to update lifetime of the route, and

the route establishment means for the second and third communication terminals update the lifetime for the corresponding route in accordance with the route request.

18. The communication system according to claim 14,

wherein, when retransmitting the route request, the route request transmission means for the first communication terminal changes to relieve conditions specified as the route request.

19. A communication terminal device comprising:

transmission means for transmitting a specified first message assigned with an intended first communication terminal as transmission destination; and

route request transmission means for using the first communication terminal as transmission destination and for transmitting a route request composed of a request for the route to be used for communication with the first communication terminal.

20. The communication terminal device according to claim 19,

wherein the route request transmission means transmits the

route request corresponding to an attribute of data to be transmitted to the first communication terminal.

21. The communication terminal device according to claim 19,

wherein, when retransmitting the route request, the route request transmission means changes to relieve a request for the route.

22. A communication terminal device comprising:

route creation means for duplicatively receiving a first message originated from a first communication terminal or a second message originated from a second communication terminal in response to the first message to create a plurality of routes to the first and second communication terminals; and

route establishment means for establishing a communication route between the first and third communication terminals using the route which belongs to the plurality of routes created by the route creation means and satisfies the route request based on a route request originated from the first communication terminal and composed of a request for the route to be used for communication with the second communication terminal.

23. The communication terminal device according to claim 22,

wherein the route establishment means individually establishes the communication route from the first communication terminal to the second communication terminal and the communication route from second communication terminal to the first communication terminal so as to be different from each other based on the route request and a response originated from the second communication

terminal in response to the route request.

24. The communication terminal device according to claim 22, wherein the route establishment means updates lifetime of the corresponding route based on the route request.

25. A control method for a communication terminal device, comprising:

a first step of duplicatively receiving a first message originated from a first communication terminal or a second message originated from a second communication terminal in response to the first message to create a plurality of routes to the first and second communication terminals; and

a second step of establishing a communication route between the first and third communication terminals using the route which belongs to the plurality of created routes and satisfies the route request based on a route request originated from the first communication terminal and composed of a request for the route to be used for communication with the second communication terminal.

26. A communication terminal device comprising:

route creation means for duplicatively receiving a first message originated from a first communication terminal to itself as destination to create a plurality of routes to the first communication terminal; and

route establishment means for establishing a communication route to the first communication terminal using the route which belongs to the plurality of routes created by the route creation means and satisfies the route request based on a route request

originated from the first communication terminal and composed of a request for the route to be used for communication with itself.

27. A communication system comprising a plurality of communication terminals, and based on a message originated from a first communication terminal to a third communication terminal via a second communication terminal, creates routes to the first communication terminal by using the second and third communication terminals to communicate between the first and third communication terminals via the created route,

wherein the second communication terminal has state notification means for detecting a possible disconnection state in terms of a disconnection symptom for communication on the route as an upstream side for the message and notifying the possible disconnection state to the first communication terminal, and

the first communication terminal has message origination means for generating the message using a creation condition according to a route other than the route matching the possible disconnection state notified from the second communication terminal and originating the message.

28. The communication system according to claim 27,

wherein the state notification means detects the possible disconnection state based on at least two different communication criteria.

29. The communication system according to claim 27,

wherein the state notification means limits the number of the possible disconnection states notified to the first

communication terminal at a specified ratio.

30. The communication system according to claim 27, wherein the message origination means generates the message using a creating condition according to the route in a better condition than the possible disconnection state.

31. The communication system according to claim 27, wherein the message origination means measures the number of notifications of the possible disconnection state notified from the second communication terminal on a unit time basis and, when a measurement result exceeds a specified number of times, generates the message using a creation condition according to a route other than the route.

32. The communication system according to claim 31, wherein the message origination means measures the number of notifications of the possible disconnection state notified from the second communication terminal on a unit time basis and, when a measurement result exceeds a specified number of times, generates the message using a creation condition according to a route in a better state than statistical results of the possible disconnection states corresponding to the number of notifications.

33. A communication terminal device which mediates between a communication terminal as transmission origin and a communication terminal as transmission destination and based on a message originated from the communication terminal as transmission origin to the communication terminal as transmission destination, creates

a route to the communication terminal as transmission origin, the communication terminal device comprising:

state notification means for detecting a possible disconnection state in terms of a disconnection symptom for communication on the route as an upstream side for the message and notifying the possible disconnection state to the communication terminal as transmission origin.

34. The communication terminal device according to claim 33, wherein the state notification means detects the possible disconnection state based on at least two different communication criteria.

35. The communication terminal device according to claim 33, wherein the state notification means limits the number of the possible disconnection states notified to the communication terminal as transmission origin at a specified ratio.

36. A communication method for a communication terminal device which mediates between a communication terminal as transmission origin and a communication terminal as transmission destination and based on a message originated from the communication terminal as transmission origin to the communication terminal as transmission destination, creates a route to the communication terminal as transmission origin, the communication method comprising:

a first step of detecting a possible disconnection state in terms of a disconnection symptom for communication on the route as an upstream side for the message; and

a second step of notifying the possible disconnection state detected by the first step to the communication terminal as transmission origin.

37. A communication terminal device which, based on a message originated from itself to a communication terminal as transmission destination, creates a route to itself by means of a communication terminal mediating between itself and a communication terminal as transmission destination and communicates with a communication terminal as transmission destination via the created route, the communication terminal device comprising:

message origination means for, when the mediating communication terminal notifies a possible disconnection state in terms of a disconnection symptom for communication on the route upstream of the message, generating the message using a creation condition according to a route other than the route matching the possible disconnection state and originating the message.

38. The communication terminal device according to claim 37,

wherein the message origination means generates the message using a creating condition according to the route in a better condition than the possible disconnection state.

39. The communication terminal device according to claim 37,

wherein the message origination means measures the number of notifications of the possible disconnection state notified from the mediating communication terminal on a unit time basis and, when a measurement result exceeds a specified number of times, generates the message using a creation condition according to a route other

than the route.

40. The communication terminal device according to claim 39, wherein the message origination means measures the number of notifications of the possible disconnection state notified from the mediating communication terminal on a unit time basis and, when a measurement result exceeds a specified number of times, generates the message using a creation condition according to a route in a better state than statistical results of the possible disconnection states corresponding to the number of notifications.

41. A communication method for a communication terminal device which, based on a message originated from itself to a communication terminal as transmission destination, creates a route to itself by means of a communication terminal mediating between itself and a communication terminal as transmission destination and communicates with a communication terminal as transmission destination via the created route, the communication method comprising:

a first step of, when the mediating communication terminal notifies a possible disconnection state in terms of a disconnection symptom for communication on the route upstream of the message, generating the message using a creation condition according to a route other than the route matching the possible disconnection state; and

a second step of originating the message generated by the first step.

42. A program for a communication terminal device which

mediates between a communication terminal as transmission origin and a communication terminal as transmission destination and based on a message originated from the communication terminal as transmission origin to the communication terminal as transmission destination, creates a route to the communication terminal as transmission origin, the program comprising:

a first step of detecting a possible disconnection state in terms of a disconnection symptom for communication on the route as an upstream side for the message; and

a second step of notifying the possible disconnection state detected by the first step to the first communication terminal.

43. A program for a communication terminal device which, based on a message originated from itself to a communication terminal as transmission destination, creates a route to itself by means of a communication terminal mediating between itself and a communication terminal as transmission destination and communicates with a communication terminal as transmission destination via the created route, the program comprising:

a first step of, when the mediating communication terminal notifies a possible disconnection state in terms of a disconnection symptom for communication on the route upstream of the message, generating the message using a creation condition according to a route other than the route matching the possible disconnection state; and

a second step of originating the message generated by the first step.